DYNAMIC URBAN FABRIC

Interchangeable modules on a draping hexagonal armature adapt to any installation

Leah Bryant*
MLA - University of Colorado Denver
Graduated May 2019

James Oberhansley
MLA - University of Colorado Denver
Graduated May 2019

Chris Quinn
MLA, MUD - University of Colorado Denver
Graduation December 2019

TEAM BIO: Leah Bryant

Born and raised in rural Georgia, I'm another Colorado transplant, here for the weather, the mountains, and the communities, along with the opportunities for a career that fulfills my interests in people, plants, and sustainability. Being a transplant comes with an interesting host of opinions and experiences, but putting down roots in a new place seems well suited to my personality and to my academic and professional career - I've been passionate about plants since I could remember to water the garden, and I aim to make this passion the foundation for a fulfilling and interesting career.

In college, I was fascinated by the workings of our minds, and majored in psychology while pairing it with two minors in environmental studies and music. However, landscape architecture presents a better opportunity: I am able encourage my interest in how people work, interact, and think about their physical surroundings, combine it with the conviction that sustainability and environmental considerations should be a part of any and all future endeavors, and tie it all together with my life-long passion for plants by using plant material to enact positive change in our environments.

Growing up hiking in the Appalachian mountains, completely falling in love with the San Juan mountains while living in Durango, Colorado, and (so far) climbing 33 of the 58 Colorado "Fourteeners" has given me a great appreciation for having access to nature, and providing that access through design in urban settings became the focus of each of my academic projects at the University of Colorado Denver. Having just received my master's degree in Landscape Architecture, I see the necessity of improving our cities, our local ecosystems, and our communities, and am excited for the challenges and opportunities ahead. I firmly believe that we can make cities more livable and more supportive of our environments – both urban and natural – by encouraging access to nature, protecting it, and using plants to make nature an integral part of our cities and communities.

Leah R. Bryant

Education

University of Colorado - Denver – Denver, CO
Master of Landscape Architecture
Overall GPA – 3.95

August 2016 – May 2019
Sigma Lambda Alpha

Agnes Scott College – Decatur, GA
Bachelor of Arts: Psychology
Overall GPA - 3.92

August 2009 - May 2013
Summa cum laude & Phi Beta Kappa

Work Experience

UCD Design Fabrication Lab – Denver, CO — January 2018 – May 2019
Laser Lab Monitor
- Monitor and train College of Architecture and Planning students on use of laser-cutting machines and 3D printers.

BrightView Design Group – Denver, CO — May 2018 – December 2018
Landscape Design Intern
- Worked on plan preparation, research, and concept through construction documents alongside other Landscape Architects.

University of Colorado Denver – Denver, CO — August 2017 – December 2017
Graduate Teaching Assistant
- Aided faculty member for the Computer Applications course, which focuses primarily on teaching AutoCAD to graduate students.

Coastal Maine Botanical Gardens – Boothbay, ME — May 2017 – August 2017
Public Horticulture Intern
- Team member in Horticulture Department; performed daily garden management and Co-Managed the Education Center garden.

U.S. Green Building Council Colorado – Denver, CO — September 2016 – January 2017
Assessment and Landscape Intern
- Assessed energy-efficient opportunities and appropriate landscape plans for non-profit as part of USGBC ADVANCE program.

Native Roots Garden Center – Durango, CO — April 2016 – August 2016
Nursery Employee
- Maintained stock of annual plants and fertilization system, placed orders and interacted with customers as sales person, customer service, and source of plant information.

Throttle Up! Corp. DBA SoundTraxx – Durango, CO — August 2014 – April 2016
Executive Assistant
- Served as personal assistant to COO and CEO, performed portion of HR duties and IT duties, and served as point of contact for general contractor and architect during the company's process of building new headquarters.

Agnes Scott College – Decatur, GA — May 2013 – May 2014
Sustainability Fellow and Office Manager
- Organized outreach/engagement events for faculty, staff, and students to expand sustainability initiatives and education, supervised work-study students and interns, and overhauled the office's website.

Skills

AutoCAD
Adobe Creative Suite
ArcGIS
SketchUp
Rhinoceros 6

Written and verbal communication
Creative thinking and problem solving
Collaboration, delegation, and leadership
Organizational management & adaptability
Spatial reasoning/comprehension

Leah R. Bryant

Contact information redacted for privacy

Honors and Awards

ASLA Award of Honor – *Awarded by jury to graduate students who have a minimum GPA of 3.70, demonstrate high academic scholarship and accomplishments, and are deemed truly outstanding by faculty/department standards*

Tau Sigma Delta – *Eligible architecture and design students rank in the upper 20% of their class*

Sigma Lambda Alpha – *Eligible graduate students have a minimum 3.5 GPA and rank in the upper 35% of their class*

Norris Design Scholarship – *Awarded to MLA students with a minimum 3.2 GPA and must submit a portfolio*

Clinton Family Endowed Scholarship – *Awarded to graduate students in good standing interested in traditional design*

Exemplary First Year Master of Landscape Architecture Student – *Given to one student in the department for overall achievement in Landscape Architecture*

Phi Beta Kappa - *Elected members must study liberal arts and sciences, and have a GPA in the top 10% of their class*

Psi Chi Honor Society - *Members must major or minor in Psychology, and have a GPA in the top 35% of their class*

Letitia Pate Evans Scholarship - *Merit-based award given to students with excellent academic records*

Nanette Hopkins Music Scholarship - *Merit-based award given to students who major or minor in music*

Miriam Drucker Travel Award Fund - *Travel money given to allow students to attend academic conferences*

Agnes Advantage Award - *Merit-Based award given to students to fund experiential learning*

Al & Virginia Pearson Hayes Award – *Awarded to individuals with high involvement in sustainability at Agnes Scott College*

Extracurricular Activities

Apprentice Colorado Master Gardener — Trainee: January 2019 – April 2019; Volunteer: April 2019 – Present

Run by the Colorado State University, the CMG program educates Colorado residents to deliver research-based gardening information to foster successful gardening in Colorado communities.

ASLA CO – Student Chapter — Member: August 2016 – May 2019; President: May 2018 – May 2019

Student-run chapter collaborates with local chapter, while internally providing resources and connections to current students.

ROOT Magazine — August 2017 – May 2018

Student-produced journal/magazine featuring essays, research, and creative work by students, faculty, and professionals of Landscape Architecture, created and sustained by MLA graduate students at the University of Colorado Denver.

TEAM BIO: James Oberhansley

My name is James Oberhansley, and I come from a small town in southeastern Idaho. I grew up near places like Yellowstone National Park and Grand Teton National Park and developed an appreciation and passion for the outdoors and landscape design at an early age. I believe in finding passion in whatever work or leisurely activity I engage in. Through the various jobs and hobbies I have been involved with, there has been one connecting thread: a passion for design.

During the past few years that passion for design has been centered on the physical, mental, and social benefits that come from interacting with people, plants, and the general outdoor environment. Having young kids of my own, I see the importance for children of all ages to have a balanced relationship with their environments.

While at graduate school the majority of my studio projects have all had a common theme: invite people to stay outside for long moments of time and be in a space that facilitates face-to-face not face-to-screen social engagements. In my designs, my desire is to (re)connect others with their local landscapes, neighbors, and themselves, while creating something that shows intelligence and evokes meaning.

James Oberhansley

Redacted for Privacy

Relevant Experience

Design/Build Internship — May 2018 - Aug. 2018
Landwise, LLC
Denver, Colorado
- Created residential designs, bids, and estimates for clients
- Field leader for production crews

Fabrication Lab Senior Staff Specialist — Jan. 2016 - May 2019
College of Architecture and Planning | UC - Denver
-Monitored and maintained labs, tools, and equipment
-Supervised student coworkers

Teacher's Assistant — Sep. 2017 - Dec. 2017
LDAR 6631 Construction Materials
- Facilitated study sessions and material for students
- Developed lesson plans and conducted classes

Landscape Designer & Sales — Sep. 2014 - Jul. 2016
K & D Round's Landscape Services
Norfolk, Virginia
-Created high-end 3D residential designs, bids, and estimates for clients
-Designed and installed spring and fall annual color
-Hardscape crew lead / ICPI Advanced Residential Certification

Masters in Landscape Architecture — Aug. 2016 - May 2019
University of Colorado - Denver

Bachelor of Science in Horticulture -Design/Build — Jan. 2010 - Apr. 2014
Minor in Business
Brigham Young University - Idaho

Sigma Lambda Alpha Inductee — March 2019
Scholastic honor society that recognizes academic achievement among students in the field of landscape architecture.

ASLA Certificate of Honor — May 2018
Recognition of outstanding academic achievement

Urban Horticulture Club Vice President — 2017 - 2018
Worked with teams of volunteers to install green roof modules on the College of Architecture and Planning building.

Skills

Digital

- Microsoft Office
- Adobe Photoshop
- Adobe Illustrator
- Adobe InDesign
- AutoCAD
- Rhinoceros 3D

Operation

CNC Router
Laser Cutter
3D Printing
Small Machinery

Craft

Photography
Arboriculture
Plant Care & ID
Basic Woodwork
Basic Metalwork

TEAM BIO: Chris Quinn

Chris Quinn is a graduate student at the University of Colorado Denver seeking masters' degrees in Landscape Architecture and Urban Design. Chris is a native of San Diego, CA and received his undergraduate degree in Urban and Regional Development from the University of Arizona. With a love for the outdoors and an interest in how the urban fabric of our cities shape our daily lives, he chose to move to Colorado and continue his studies of landscape and urban design.

His focus is designing public spaces that integrate urban and natural systems. He believes that as cities become increasingly dense, it is crucial that we create functional and aesthetically pleasing public space that can serve many purposes for many different groups. Public space is an integral component of any urban center and he is interested in how these spaces function to serve the social, economic, and environmental needs of a city. The skills and experiences he has gained through international studies of planning, landscape, architecture and urban design have contributed to how he approaches each design challenge.

Chris Quinn

LANDSCAPE & URBAN DESIGNER

CONTACT

Redacted for

privacy

SKILLS

Adaptability
Community - Engagement
Attentive
Team – oriented

TECHNICAL SKILLS

Adobe CC
AutoCAD
SketchUp
ArcGIS
Landform grading
Site Analysis

INTERNATIONAL EXPERIENCE

Sydney, AUS
Feb. 2011-July 2011
Planning

Helsinki, FIN
June 2017-July 2017
Design Study & Sketching

Oslo, NOR
Sept. 2018 – Oct. 2018
Immersive Design Studio

Barcelona, SP
Jun. 2019 – July 2019
Urban Design Studio

My focus is designing public spaces that integrate urban and natural systems. As cities densify, it is crucial that we create functional and aesthetically pleasing public space that can serve many purposes. Public space is an integral segment of any urban fabric and I am interested in how it functions to serve the social, economic and environmental needs of a city. The skills and experiences I have gained in my international studies of planning, landscape, architecture and urban design has contributed to how I approach each design challenge.

EDUCATION

University of Colorado Denver (2016 – Present)

College of Architecture and Planning
Master of Landscape Architecture
Master of Urban Design

University of Arizona (2008-2012)

College of Social and Behavioral Sciences
Bachelor of Science - Urban and Regional Development
Minor – Geographic Information Systems (GIS)

EXPERIENCE

Landscape Architect Intern, Regional Transportation District
Nov. 2017 – Nov. 2018

Design lead assisting with the commuter light rail and bus network project.

- Compile construction document sheet sets
- Draft landscape and urban design sheets
- Create planting plans
- Create rendered conceptual plans and digital models
- 16th St. Mall conceptual street re-design
- Researcher for ozone days, bus stop aids for blind/visually impaired.

Healthcare Contract Admin., Next Image Medical/Work Well Prevention & Care
Apr. 2013 – July 2016

Healthcare network developer and contract negotiator for a diagnostic imaging company.

- Negotiated contract pricing and terms with providers for various medical services
- Created strategic plans for network expansion based on client demands
- Gather, organize and file provider credentialing documents
- Resolved provider concerns and issues.
- Negotiated contracts to build and maintain a national network of premium diagnostic imaging and physical therapy providers to serve workers' compensation patients and those that are un-insured or under-insured.

ACHIEVEMENTS

Sigma Lambda Alpha Honor Society Inductee – 2019

- Scholastic honor society that recognizes academic achievement in the field of landscape architecture.

NARRATIVE

By drawing from the natural patterns and processes of honeycombs, spiderwebs, and cholla cacti, a new "fabric" is created to be a dynamic, changeable, and adaptable installation which highlights transitions between built and natural edges of urban environments. The biomimetic structure maximizes form and function in a modular, living system, and plays with scale while highlighting and utilizing the construction of forms already present in nature. The system aims to address complex modern issues faced in urban environments by drawing from form, methods, and functionality that have been refined in nature through evolution.

The premise for the physical manifestation of this project is a modular system, consisting of individual frame pieces, which connect to create a flexible fabric, and allow for the insertion of modules with a range of functions. By including and proposing a range of modules, the system becomes adaptable to any installation, accounting for site needs or desires for an outcome. The ideal, proposed installation is one that includes site factors, installation needs, production capability, and most importantly, community input. The system can be inspiring in a public, urban capacity, and could have great potential on a community scale, where individuals and neighborhoods should have input.

In the currently built, full-size prototype of the project, the armature is made primarily of wood, wire rope, and acrylic, and the inserted modules include plant material, bamboo, fabric, and solar lights. The frame was built using CNC routing, laser cutting, and tried-and-true elbow grease in the form of gluing, sanding, and assembling the cut pieces. Each hexagonal frame piece is attached to the network by wire running through channels in each side. The modules were fabricated with a range of methods, from using a sewing machine, to laser cutting and sawing and gluing small sections of bamboo, but all maintain the same frame compatibility to allow for the system to adapt to the surroundings and needs of the installation. The flexible frame allows for the system to look and act like a bendable wall of honeycomb, and the modules are placed in swaths to allow for visual cohesion and comprehension.

Though weather-proofed wood could suffice for a cheaper installation, the ideal system would substitute aluminum for wood. Each frame piece would be built of aluminum, and similarly the module frames which connect them to the larger armature would also be built of aluminum. By proposing metal, the system would be significantly lighter and more robust, allowing for a greater range of applicability and installation opportunities.

Installation time would vary, depending on two factors. The first variable would be the extent of the installation; setting up the built prototype of 27 units took half a day, so assembling and building a larger system would hypothetically take an amount of time multiplied by our prototype size, i.e., a system twice as big would take twice as long. The second time variable would be the types of modules included. While each module does not take much time to construct, from 30 minutes to 2 hours, making modules for the whole system would be more time-consuming if the modules are more detailed or are untested, new modules.

Optimally, the community in which the system is installed would play a more active role in deciding which types of modules would be used and could help assemble the components. Additionally, if a community meeting or organization were to offer materials for modules which would be suitable in the installation, and an opportunity to make and install modules, it seems likely that community members could take more ownership of the result.

NARRATIVE

The Dynamic Urban Fabric is unique because it allows for performance, interaction, and customization based on the site of installation. Each module is inserted into the frame in exactly the same way, which allows community members or caretakers to aid in construction and installation. Even the installation and changing of modules is performative because the frame is self-supporting; by not necessitating a complete shut-down of an area to install or alter, the public is allowed to experience and observe a process of intervention in an urban setting.

Additionally, the modules which are closer to the users are intended for interaction; plant materials, interactive lights or games, and tactile materials are all included in proposed module functions specifically to increase interaction at the human, individual scale. The Fabric is itself an exercise in the effects of scale, as each module and frame unit is distinct, and thus comprehensible and interactive on an individual level, while simultaneously making up only a piece of the interdependent fabric, which has larger environmental impacts.

The Dynamic Urban Fabric is also unique because of the ability to customize the modules to the neighborhood, community, or urban space in which it is installed. Modules like fabric panels can be directly reflective/representative of the community by including colors that community members pick out, or by being made of donated materials from the community.

An initial installation would be one of the best opportunities in the life-cycle of this fabric for interaction with the community and the public. The decisions about which modules are included should be left up to the public, allowing for ownership and acceptance (though the suitability of certain modules would need to be determined beforehand, in the case of modules sensitive to sunlight such as solar, algae, or plant panels). By hosting a community meeting and maker-day, the public and community members could directly contribute to the included components and the installation of them. The system is designed for the innovation of new panels, and for ease of installation, so that even children could help install portions, and a community can contribute materials to the system.

An additional function of the system as being supportive of community interaction is the intention or ability to be installed in under-utilized areas, such as alleyways, in parks, on bus stops, anywhere between our urban structures, or at any edge between built and natural conditions. In a small neighborhood or town, it could enliven currently non-interactive spaces, and could help tie these spaces or built conditions back to the neighborhood, or more specifically to the community members. Though capable of being a solitary, art-like exhibit piece, the goal is not to put the system under the spotlight, but rather to highlight existing conditions and spaces through the addition of an aesthetic structure.

The system becomes makerspace through the interaction with a community, and through the inclusion of community input and materials. It turns under-utilized areas into spaces and places made by the community; it creates less of an arena for the making of products, and more of a space which is made into a resource. Having the guidance of a manager, designer, or facilitator would be crucial at certain points of the system's life cycle: determination of module suitability, installation, community creation/decisions, and any subsequent seasonal changes to the system.

In terms of ongoing maintenance and outreach, there are two possibilities: self-sufficiency or

intended dependency on facilitators/managers. In the first scenario modules requiring ongoing maintenance (like plant material) could be self-supported by other modules, e.g. if plants are included then water collection and pumps are also included in the system to allow for self-sufficiency. In the second, a manager would perform routine maintenance on the system and could also function as docent, explaining the functions of the modules/system to the public and offering interactions with the installation. The management strategy should be chosen by the community, and subject to the requirements of the installation itself, especially if some portions are not easily accessible.

One of the primary design considerations for the project was the adaptability to many types of sites and climates. Designing for a Colorado installation would necessitate a different strategy than for a climate that is less arid, but multiple climates could be accommodated by choosing different materials and modules for the specific location. The system is also not site-specific; if the fabric can be anchored to something – a building, a frame, or even itself – it can be installed. By creating a structure which flows, bends, and drapes, the structure can conform to the installation location. The only hypothetical, ideal site characteristics would be that the site is accessible by the public and exhibits some form of under-utilization, to be improved by the installation of the Dynamic Urban Fabric system.

The prototype does not use complicated technologies other than solar lights, but the proposed system can be a showcase for "green" or "sustainable" technologies. The system is functional as well as educational, and could test current and future methods and devices for green infrastructure. These technologies include, along with solar panels, algal growth and energy transfer, air filtration, sound mitigation, water collection and redistribution, sound creation though resonance or haptic interaction, and supplemental habitat.

The ability to test green infrastructure practices contributes to the overall sustainable goals of the system, by using environmentally friendly, sustainable, and even regenerative technologies in each of the modules. While the Fabric could be self-sufficient and therefore literally sustainable, it can also provide valuable information about the successes of currently accepted and proposed technologies which will aid in solving urban sustainability challenges.

Current environmental and climate challenges can be addressed by each type of module, or by a combination of modules. For example: bamboo modules aid in the reduction of urban noise pollution while offering habitat for pollinators; plant modules aid in the reduction of urban heat; filtration modules aid in reducing air pollution; water collection modules mitigate stormwater runoff. Combining the effects of these modules, the system contributes to directly improving the area in which it is installed, while educating the public in an approachable and thought-provoking manner.

In addition to the more literal sustainable technologies, the system proposes to use as much recycled material as possible in various less-technological modules from the communities in which it could be installed. By re-using personal or donated recycled material in a public installation, the system also functions by reinforcing positive benefits of reusing, and not discarding, our materials. Lastly, the system can be re-used in other locations, as it would not be permanently anchored or built; instead, using wire cable attached to anchors allows for temporary installation and easy removal. A more robust aluminum frame would also allow for

replacement of modules if necessary, but would not require replacement of the entire system, again promoting selective replacement instead of comprehensive disposal.

By combining a robust framework with modules crafted to be interchangeable, the system will exhibit an aesthetic that is simultaneously cohesive on a broad scale and interactive and individual on a closer, human scale. The interchangeable modules allow for cohesion across the system by having no variation in overall construction; it is only by the contents in each module that they can be unique in the system and provide a depth of interest, intended to inspire more investigation. Each module's individual construction will be exposed, along with the means of attachment and construction to/of the frame, and some frames can be left empty to further illuminate construction methods. By not obscuring the structural components, the system can be educational and visually appealing.

In essence, the aesthetic and functional goals of this project are the same: the Fabric is intended to create swaths of modules which contribute to a cohesive pattern, while offering adaptability and a depth of visual scales by maintaining the exposure of the system's construction. Though the overall aesthetic will be consistent, the individual modules and swaths will be varied, inspiring closer examination and allowing for education based on sustainable technologies.

The primarily wood prototype, which includes 27 frame pieces and 23 modules, and measures roughly 6.5' x 5' x 5', was built at a rough cost of $400 - $500. While suitable for a demonstration, a true installation would optimally include at least 200 modules/frame pieces and would be built of aluminum instead of wood. A (very) rough estimate would be $5000 for a single system/installation of wood. The authors do not feel confident in suggesting a cost estimate for an aluminum system, as the frame and modules have not yet been tested in that material. Additionally, milling or cutting metal components might necessitate a slightly higher cost than when using wood, but once a frame and module were developed it would theoretically be much simpler to automate and fabricate on a larger scale because of the uniformity of material. Lastly, the variation in module types makes the cost very difficult to estimate, as each type of module has not been prototyped, and the combination of modules could create a large price differentiation depending on the technologies used.

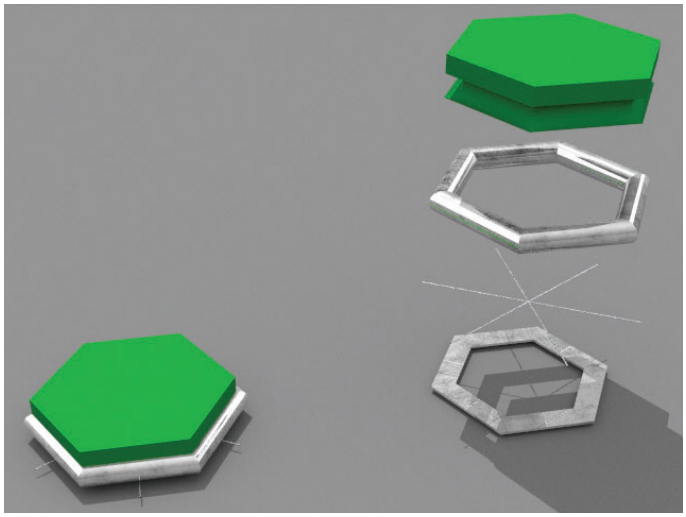
The Dynamic Urban Fabric is intentionally designed to be dynamic and changeable, not only in the variations in installations and overall adaptability, but also to the physical construction of the system's components. After all, fabric and textiles are easily manipulated, altered, and used in innovative applications; so, too, the Urban Fabric could be further refined or developed over time to better suit urban spaces for community involvement. The armature of the Dynamic Urban Fabric can be modified as needed, and the modules allow for open experimentation to take place in situations and with technologies that have not been developed or proposed here. Citizens, artists, students, community groups, innovators, industry experts, and more, are all the target audiences and stakeholders; refinement should be led by any or all of them. The Dynamic Urban Fabric, while innovative, aesthetically pleasing, and intriguing on its own, is intended to highlight spaces which are created for communities, and most importantly to create spaces which are made by the communities.

EXPLODED AXONOMETRIC DETAILS

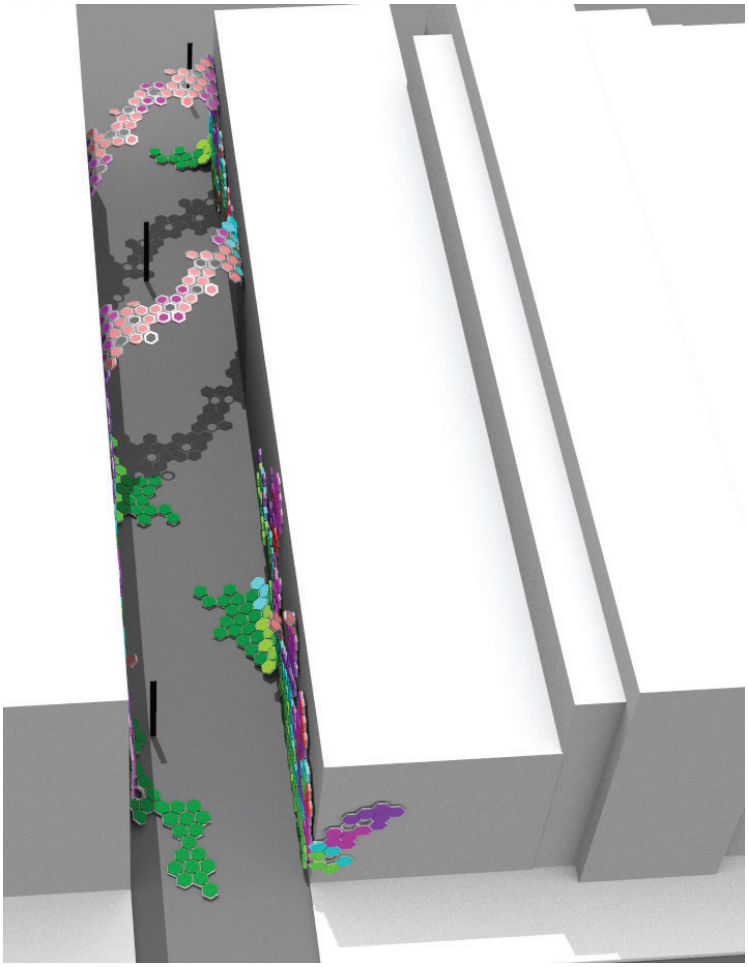
Above: As-built rendering of armature frame pieces.Primary material is wood.

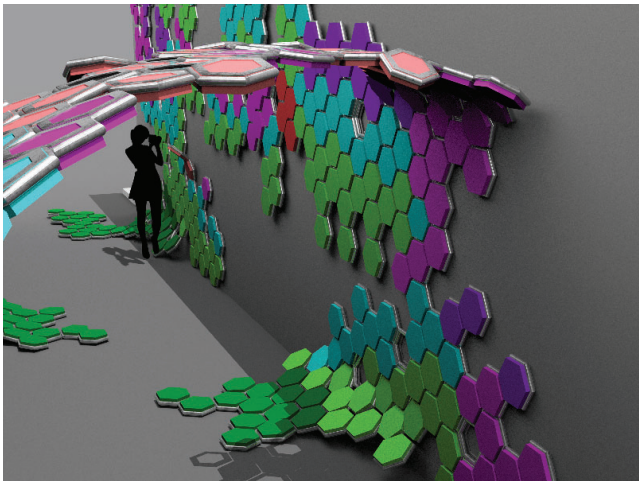
Right: Proposed rendering of armature + modules. Primary material is aluminum instead of wood.

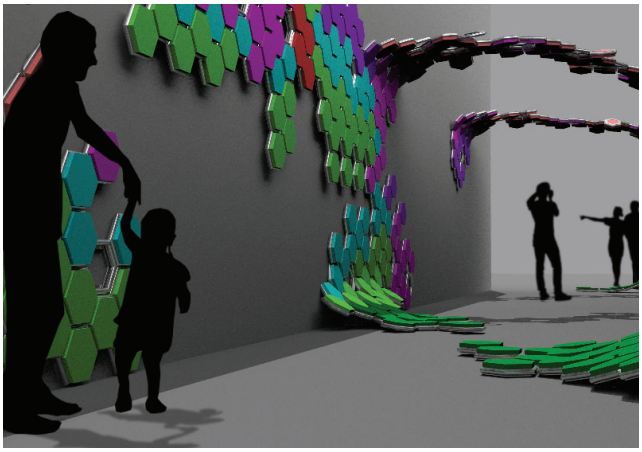
Both consist of an armature of frames connected by wire, with inserted modules that have a range of functions.

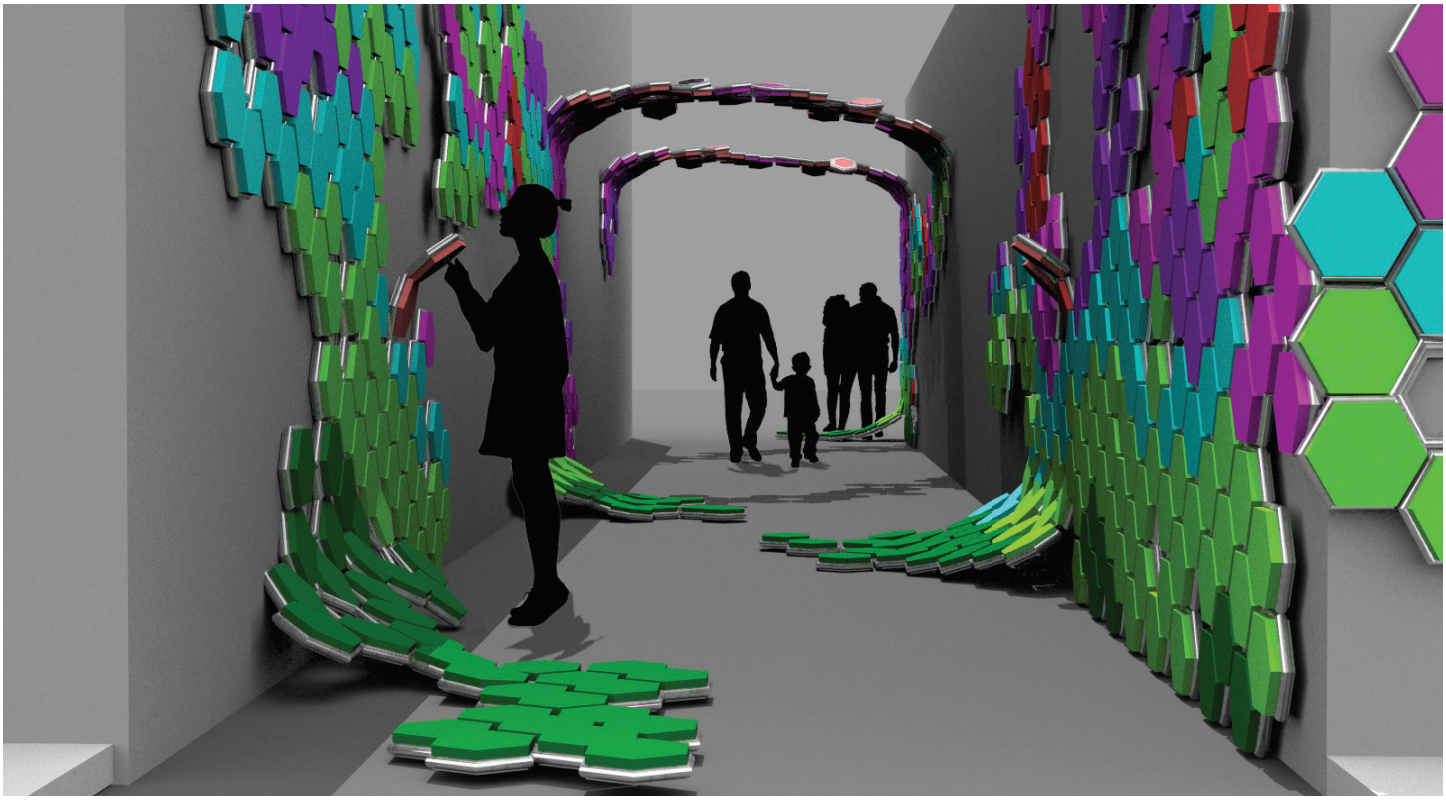


RENDERED ELEVATIONS









BUILT PROTOTYPE PLAN DIAGRAM/FUTURE USE DIAGRAM

BUILT PROTOTYPE

BUILT PROTOTYPE

RENDERED VIGNETTE